

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Priority Application Serial No. 09/115,339
Priority Filing Date July 14, 1998
Inventor Werner Juengling, et al.
Assignee Micron Technology, Inc.
Priority Group Art Unit 2813
Priority Examiner E. Kielin
Attorney's Docket No. MI22-1599
Title: Methods of Forming Materials Between Conductive Electrical Components and
Insulating Materials

PRELIMINARY AMENDMENT

To: Box Patent Application
Assistant Commissioner for Patents
Washington, D.C. 20231

From: Bernard Berman Deepak Malhotra (Tel. 509-624-4276; Fax 509-838-3424)
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AMENDMENTS

This is a preliminary amendment accompanying a Request for Divisional Application for the above-titled patent application. Prior to examining the application, please make the following amendments.

In the Specification

Page 1, after the title, insert:

--CROSS REFERENCE TO RELATED APPLICATION

This is a Divisional of U.S. Patent Application Serial No. 09/115,339, filed July 14, 1998, and titled "Methods of Forming Materials Between Conductive Electrical Components and Insulating Materials".--

In the Claims

Please replace the claims with the following clean version of the entire set of pending claims, in accordance with 37 C.F.R. §1.121(c)(1)(i). Cancel all previous versions of any pending claim.

A marked up version showing amendments to any claims being changed is provided in one or more accompanying pages separate from this amendment in accordance with 37 C.F.R. §1.121(c)(1)(ii). Any claim not accompanied by a marked up version has not been changed relative to the immediate prior version, except that marked up versions are not being supplied for any added claim or canceled claim.

Please cancel Claims 1-112 without prejudice.

113. A method for forming a low dielectric constant insulative structure disposed between a pair of conductive lines comprising:

providing the pair of conductive lines over a substrate, the conductive lines each having an upper surface;

forming a mass of a material over the substrate, the mass disposed over and between the pair of conductive lines;

planarizing the mass to a level about equal to the upper surfaces of the pair of conductive lines;

depositing a layer of insulative material; and

vaporizing at least a portion of the mass disposed between the conductive lines to form the low dielectric constant insulative structure therebetween, the structure comprising at least one void.

114. The method of Claim 113 wherein forming a mass comprises providing a material comprising a mixture of a first material substantially vaporizable in an oxidizing atmosphere and a second material substantially not vaporizable in an oxidizing atmosphere.

115. The method of Claim 114 wherein providing a material comprising a mixture comprises providing a mixture of a carbon comprising material and a silicon oxide material.

116. The method of Claim 114 wherein providing a material comprising a mixture comprises providing a mixture of carbon and SiC_x , where "x" is a number between about 0.2 and 1.5.

117. The method of Claim 113 wherein forming a mass of material comprises forming the mass by plasma decomposition of a hydrocarbon or halogen substituted hydrocarbon.

118. The method of Claim 117 wherein forming the mass by plasma decomposition comprises forming a porous carbon mass.

119. The method of Claim 113 wherein depositing a layer of an insulative material comprises depositing the layer prior to vaporizing the mass.

120. The method of Claim 113 wherein forming a layer of an insulative material comprises forming a silicon oxide layer having a thickness of about 500 Angstroms.

121. The method of Claim 120 wherein forming a silicon oxide layer comprises forming the layer by sputter deposition of silicon dioxide.

122. The method of Claim 113 wherein forming a layer of an insulative material comprises forming the layer after vaporizing the mass.

123. The method of Claim 113 wherein forming a mass of material comprises forming the mass of a material comprising about 20% to about 80% SiC_x , where "x" is a number from about 0.2 to about 1.5.

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REMARKS

This preliminary amendment accompanies a Request for Divisional Application.

In the parent application, the Examiner invoked restriction between Claims 1-16, 18-23, 28-35, 37-41, 42-50, 51-74, and 97-112, Group I, and Claims 113-23, Group II. The subject matter of Group I was elected in the parent application. This divisional application is directed to the subject matter of Group II.

Therefore, Claims 1-112 are canceled leaving Claims 113-123 pending in the application. Examination of Claims 113-123 is respectfully requested.

Respectfully submitted,

Dated: March 28, 2001

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